| 00 20. | Theory of computation | | | | |
|-----------------------|-----------------------|------|------|------------------------------------|----------|
| | Göös Mika | | | | |
| Cursus | | Sem. | Туре | Language of teaching Credits | English |
| Communication systems | | BA4 | Obl. | | English |
| Computer science | | BA6 | Obl. | | 6 |
| HES - IC | | E | Opt. | Session Semester | Summer |
| | | | | Exam | Written |
| | | | | Workload | 180h |
| | | | | Weeks | 14 |
| | | | | Hours | 4 weekly |
| | | | | Lecture | 2 weekly |
| | | | | Exercises | 2 weekly |
| | | | | Number of | |

CS-251 Theory of computation

Summary

This course constitutes an introduction to theory of computation. It discusses the basic theoretical models of computing (finite automata, Turing machine), as well as, provides a solid and mathematically precise understanding of their fundamental capabilities and limitations.

Content

- Basic models of computation (finite automata, Turing machine)
- · Elements of computability theory (undecidability, reducibility)
- Introduction to time complexity theory (P, NP and theory of NP-completeness)

Keywords

theory of computation, Turing machines, P vs. NP problem, complexity theory, computability theory, finite automata, NP-completeness

Learning Prerequisites

Required courses CS-101 Advanced information, computation, communication I CS-250 Algorithms

Learning Outcomes

By the end of the course, the student must be able to:

- Perform a rigorous study of performance of an algorithm or a protocol
- Classify computational difficulty of a decision problem
- Define the notion of NP-completeness
- Analyze various computation models
- Design a reduction between two computational problems
- Characterize different complexity classes
- Explain P vs. NP problem

Transversal skills



positions

- Use a work methodology appropriate to the task.
- Continue to work through difficulties or initial failure to find optimal solutions.

Teaching methods

Ex cathedra with exercises

Assessment methods

Written exam and continuous control

Resources

Moodle Link

• https://go.epfl.ch/CS-251